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## PATENT SPECIFICATION

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NO DRAWINGS

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## COMPLETE SPECIFICATION

## Improvements in or relating to Yarn Packages

We, SEWING SILKS LIMITED, a Company organised under the laws of Great Britain, of Perivale Mills, Greenford, Middlesex, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to yarn packages and in particular to coreless cops for loom shuttles.

While the manufacture and use of coreless cops do not raise serious problems in connection with natural threads such as cotton or linen, when a slippery surfaced thread such as one made of continuous filaments of synthetic material, e.g. nylon or "Terylene" (registered Trade Mark) is to be packaged as a coreless cop, difficulties arise due to the poor thread-to-thread adhesion involved. It has been found for example that it is impossible to wind continuous filament "Terylene" yarn as a cylindrical coreless cop which has straight walls, remains firm, does not collapse particularly during sudden frequent motion, and does not unravel and tangle without additional means to support the outer surfaces.

It is the object of the present invention to provide a satisfactory coreless cop of yarn made of continuous filaments of synthetic material, which furthermore, does not require the end of the thread to be secured in any way such as tucking, as it will remain in its correct position due to the thread's adhesion.

According to the invention, a coreless cop for a loom shuttle comprises yarn of continuous filaments of synthetic material which has been treated in a substantially untensioned state, prior to winding, by coating the yarn with a non-adhesive thermo-setting or thermoplastic compound dissolved or dispersed in a volatile liquid vehicle and then drying the yarn to remove the volatile liquid vehicle so as to cause the yarn to be self-adherent without being tacky.

The expression "self-adherent without being tacky" is to be understood to mean that the

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yarn is caused to adhere to itself to a degree sufficient to prevent the yarn unwinding in the absence of applied tension, and that after the treatment the yarn is free from stickiness or tack and will not adhere to any other surface.

According to the invention also, a method of producing a coreless cop for a loom shuttle of yarn of continuous filaments of synthetic material comprises the steps of coating the yarn with non-adhesive thermo-setting or thermoplastic compound dissolved or dispersed in a volatile liquid vehicle, drying the yarn at a temperature to remove the volatile liquid vehicle whereby the yarn is caused to be self-adherent without being tacky and then winding the yarn, the coating and drying steps being carried out while the yarn is maintained in a substantially untensioned state.

If the coating compound is thermo-setting, the final package is subjected either during or after winding to a temperature sufficient to cure the material.

The yarn may be twisted with either a balanced or unbalanced twist prior to the coating treatment.

The coating process may be carried out in any convenient way known in the art. For example, the yarn to be coated may be led through a bath of the coating solution or dispersion and after the excess has been removed by wipers, dried at a moderate temperature in the drying chamber, whereby the coating compound is not brought to a fully cured state.

The yarn so coated is of a flaccid or dead nature, enabling it to be readily wound on or off cops or spools, and its surface is non-slippery although insufficiently adhesive to be considered tacky.

In one preferred method of manufacture of a coreless shuttle exemplifying the invention, a yarn is first formed by twisting together or doubling a number of continuous filaments of synthetic material, e.g., nylon or "Terylene". The yarn so formed is then carried through a bath of the coating materials dissolved or dis-

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persed in a volatile liquid vehicle, and after excess coating has been removed by wiping, the coated yarn is dried, to remove the liquid vehicle and leave only the coating material upon the yarn, at a temperature insufficient to fully cure or to melt the coating. The coated yarn is then wound in the conventional way to produce an unflanged coreless cop. Due to the thread-to-thread adhesion, which is equivalent to that found between staple fibre threads, produced by the coating, the cop so produced is stable, and the yarn as it is pulled away from the cop exhibits little tendency to snarl. The coating compound may comprise any of the water insoluble materials known in the art, for example, nylon polymers, polyvinyl acetate, and acrylic polymers, and the strength of the solution or dispersion is preferably between 3% and 20%. Normally a 5% solution or dispersion of these particular materials is satisfactory but higher percentages such as 10% or even 20% can be used depending on the thickness of the yarn which could either be a single or folded yarn, depending on the purpose for which it is required.

The invention is illustrated by the following Examples:

#### EXAMPLE I

A 1,000 denier continuous filament high tenacity "Terylene" thread is twisted either "S" or "Z" and passed through a bath containing 5% nylon polymer and 2 methyl stearate for lubrication. After the bath the thread is passed over synthetic foam material to remove excess moisture. It is then treated in steam at 75°C for 20 minutes. The thread is 2-fold and packages are wound from this material passing the thread again through a bath of a similar solution. The final wound packages are again exposed, this time in moulds to a temperature of 110°C. After 35 minutes the packages are suddenly cooled, which gives them the desired firmness which the package must maintain during sudden backward and forward movements.

#### EXAMPLE II

Three ends of 750 denier "Terylene" are lightly twisted to give virtually a single yarn. This floss yarn is passed slowly through a concentrated bonding solution of 12½% of acrylic emulsion and 4½% of a lubricant (Methyl Stearate). Thread thus processed is steamed at 75°C for 20 minutes. The thread is then finally wound into the desired packages, placed into moulds and exposed to a temperature of 110°C. for 40 minutes. Sudden cooling is again desirable to achieve the required results.

#### WHAT WE CLAIM IS:—

1. A coreless cop for a loom shuttle comprising yarn of continuous filaments of synthetic material which has been treated in a substantially untensioned state, prior to winding, by coating the yarn with a non-adhesive thermo-setting or thermoplastic compound dissolved or dispersed in a volatile liquid vehicle and then driving the yarn to remove the volatile liquid vehicle so as to cause the yarn to be self-adherent without being tacky (as hereinbefore defined)

2. A coreless cop according to claim 1 insofar as the coating compound is thermo-setting wherein the yarn has been subjected to heat treatment at a temperature sufficient to cure the material during or after final winding to form the cop.

3. A coreless cop according to claim 1 or 2 wherein the coating compound is any of those hereinbefore specifically mentioned.

4. A coreless cop according to any of claims 1—3 wherein the filaments are of a polyamide or polyester.

5. A coreless cop for a loom shuttle substantially as hereinbefore described.

6. A method of producing a coreless cop for a loom shuttle of yarn of continuous filaments of synthetic material comprising the steps of coating the yarn with non-adhesive thermo-setting or thermoplastic compound dissolved or dispersed in a volatile liquid vehicle, drying the yarn at a temperature to remove the volatile liquid vehicle whereby the yarn is caused to be self-adherent without being tacky (as hereinbefore defined), and then winding the yarn, the coating and drying steps being carried out while the yarn is maintained in a substantially untensioned state.

7. A method according to Claims 6 wherein the yarn is coated with a thermo-setting compound including the further step of subjecting the yarn to heat treatment at a temperature sufficient to cure the coating material during or after the winding step.

8. A method according to any of claims 6—8 wherein the strength of the coating solution or dispersion is between 3% and 20%.

9. A process according to claims 6 to 8 wherein the yarn is coated by being led through a bath of the coating solution or dispersion, the excess being removed by wipers prior to drying.

10. A process according to any of claims 6 to 9 wherein the coating compound is any one of those hereinbefore specifically mentioned.

11. A process of making coreless cops for

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loom shuttles of yarn of continuous filaments of synthetic material substantially as hereinbefore described with reference to either of the foregoing Examples.

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